

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
22 January 2004 (22.01.2004)

PCT

(10) International Publication Number  
WO 2004/008425 A3

(51) International Patent Classification<sup>7</sup>: G09G 5/24,  
5/28, 3/34

(21) International Application Number:  
PCT/JP2003/008935

(22) International Filing Date: 14 July 2003 (14.07.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
2002-207561 16 July 2002 (16.07.2002) JP

(71) Applicant (for all designated States except US): SHARP  
KABUSHIKI KAISHA [JP/JP]; 22-22, Nagaichecho,  
Abeno-ku, Osaka-shi, Osaka 545-8522 (JP).

(72) Inventors; and

(75) Inventors/Applicants (for US only): KOYAMA,  
Noriyuki [JP/JP]; 4-19-14, Seikadai, Seikacho, So-  
raku-gun, Kyoto 619-0238 (JP). OKADA, Satoshi

[JP/JP]; 5-11-10, Kunimidai, Kizuchō, Soraku-gun, Ky-  
oto 619-0216 (JP). ASAI, Yoshimi [JP/JP]; 18-28-408,  
Abenomotomachi, Abeno-ku, Osaka-shi, Osaka 545-0034  
(JP).

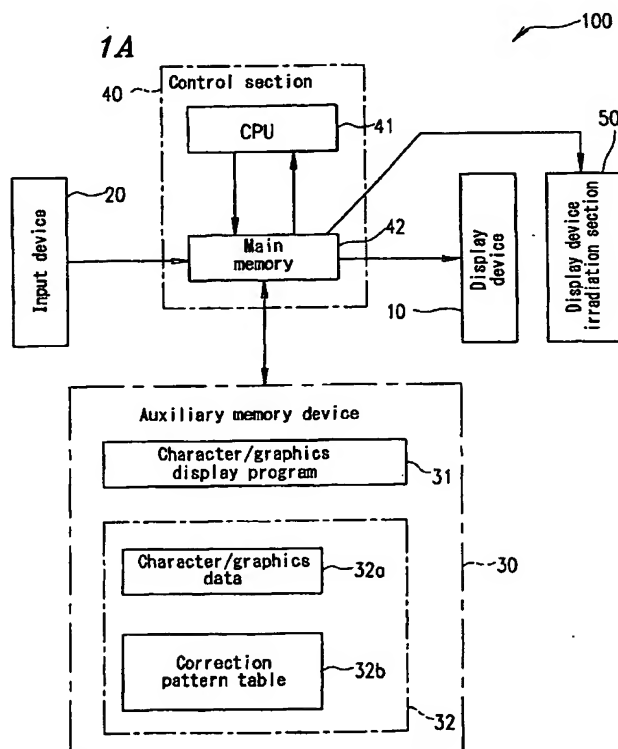
(74) Agents: YAMAMOTO, Shusaku et al.; Fifteenth Floor,  
Crystal Tower, 2-27, Shiomi 1-chome, Chuo-ku, Osaka-  
shi, Osaka 540-6015 (JP).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC,  
SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,  
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

[Continued on next page]

(54) Title: DISPLAY APPARATUS FOR VARYING DISPLAY OF CHARACTER ATTRIBUTES IN RESPONSE TO BRIGHT-  
NESS OF BACKLIGHT OR VIEWER PREFERENCES



(57) Abstract: A display apparatus is provided, which comprises a display device including a display screen for displaying characters and/or graphics, in which each of the characters and/or graphics contains a basic portion and a neighboring portion arranged in the vicinity of the basic portion. A control section controls the display device and sets a luminance level of the sub-pixels of which basic portion is comprised and a luminance level of sub-pixels of the neighboring portion in accordance with the level of intensity of light for irradiating the display screen. The display screen may be irradiated via a backlight, front light or side light. The display device may also be controlled in response to information about the user, i.e. whether the user is visually impaired as a result of e.g. cataracts.



European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:  
15 April 2004

**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G09G5/24 G09G5/28 G09G3/34

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G09G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 1 158 485 A (SHARP KK) 28 November 2001 (2001-11-28) cited in the application paragraph '0109! - paragraph '0111! paragraph '0283! - paragraph '0286! paragraph '0297! - paragraph '0298!; figures 1-7, 36-38 ---	1-13, 16-21
Y	EP 0 883 103 A (THOMSON MULTIMEDIA SA) 9 December 1998 (1998-12-09)  page 2, column 2, line 29 -page 3, column 3, line 33; figures 2,3 page 3, column 3, line 47 -page 3, column 3, line 58 --- -/--	1-9, 11-13, 16-23

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*&\* document member of the same patent family

Date of the actual completion of the international search

23 January 2004

Date of mailing of the international search report

05/02/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Morris, D

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 907 158 A (SHARP KK) 7 April 1999 (1999-04-07) paragraph '0045! - paragraph '0046! paragraph '0083! - paragraph '0084! paragraph '0118!; figures 3,5,6D ----	1-10, 16-23
Y	US 5 398 022 A (LIPP RONALD L) 14 March 1995 (1995-03-14) column 1, line 65 -column 2, line 29 column 3, line 41 -column 4, line 23; figures 1,2 ----	13
Y	EP 1 026 659 A (SHARP KK) 9 August 2000 (2000-08-09) paragraph '0062! - paragraph '0068! paragraph '0295! - paragraph '0299!; figures 9-11,26-28 ----	1-13, 16-23
Y	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 21, 3 August 2001 (2001-08-03) & JP 2001 100725 A (SHARP CORP), 13 April 2001 (2001-04-13) cited in the application abstract ----	1-23
Y	WINKLER R ET AL: "READABILITY OF ELECTRONIC DISPLAYS" PROCEEDINGS OF THE SID, SOCIETY FOR INFORMATION DISPLAY. PLAYA DEL REY, CA, US, vol. 21, no. 4, 1980, pages 309-313, XP009020838 page 311, right-hand column, paragraph 4 -page 312, left-hand column, paragraph 7 ----	14,15, 24-41
Y	US 5 475 399 A (BORSUK SHERWIN M) 12 December 1995 (1995-12-12) column 1, line 8 -column 1, line 18 column 4, line 49 -column 5, line 25; figures 2,3 column 7, line 66 -column 8, line 12 ----	24-41
A	----- -/--	14,15

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>CHANGYUAN HU ET AL: "Automatic synthesis of contrast controlled grayscale characters with component-based parametrisable fonts" IMAGE PROCESSING, 1999. ICIP 99. PROCEEDINGS. 1999 INTERNATIONAL CONFERENCE ON KOBE, JAPAN 24-28 OCT. 1999, PISCATAWAY, NJ, USA, IEEE, US, 24 October 1999 (1999-10-24), pages 348-351, XP010368715 ISBN: 0-7803-5467-2 page 349, left-hand column, paragraph 3 -page 349, right-hand column, paragraph 4 page 351, left-hand column, paragraph 1 -page 351, left-hand column, paragraph 2; figures 3,4,6</p> <p>-----</p>	14,15, 24-41
A	<p>US 5 406 305 A (SHIGETA TERUAKI ET AL) 11 April 1995 (1995-04-11) cited in the application column 4, line 42 -column 5, line 8 column 9, line 9 -column 9, line 16; figures 1,4</p> <p>-----</p>	1-3, 7-10, 16-23

# INTERNATIONAL SEARCH REPORT

International Application No.  
PCT/JP 03/08935

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-13,16-23

A display apparatus in which the control section sets the luminance level of the basic portion and the luminance of the neighboring portion in accordance with the intensity of light for irradiating the display screen

2. Claims: 14,15,24-41

A display apparatus in which the control section sets the luminance level of the basic portion and the luminance of the neighboring portion in accordance with information related to a viewer of the display device.

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP 03/08935

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1158485	A	28-11-2001	JP 2002049366 A CN 1333530 A EP 1158485 A2 US 2002015046 A1	15-02-2002 30-01-2002 28-11-2001 07-02-2002
EP 0883103	A	09-12-1998	EP 0883103 A1 JP 11065537 A	09-12-1998 09-03-1999
EP 0907158	A	07-04-1999	JP 11102171 A JP 11102173 A DE 69802487 D1 DE 69802487 T2 EP 0907158 A1 US 6219021 B1	13-04-1999 13-04-1999 20-12-2001 23-05-2002 07-04-1999 17-04-2001
US 5398022	A	14-03-1995	NONE	
EP 1026659	A	09-08-2000	CN 1264864 A ,B EP 1026659 A2 JP 2001100725 A US 6542161 B1	30-08-2000 09-08-2000 13-04-2001 01-04-2003
JP 2001100725	A	13-04-2001	CN 1264864 A ,B EP 1026659 A2 US 6542161 B1	30-08-2000 09-08-2000 01-04-2003
US 5475399	A	12-12-1995	US 5233333 A	03-08-1993
US 5406305	A	11-04-1995	JP 2752309 B2 JP 6214508 A	18-05-1998 05-08-1994